CSE
COMPUTER SCIENCE & ENGINEERING

LAB WORKBOOK

17CS2212 MACHINE LEARNING

Team ML
KLH (DEEMED TO BE UNIVERSITY) | MACHINE LEARNING – 17CS3166

LABORATORY WORKBOOK

STUDENT NAME	
REG. NO	
YEAR	
SEMESTER	
SECTION	
FACULTY	

Table of Contents

Organization of the STUDENT LAB WORKBOOK

The laboratory framework includes a creative element but shifts the time-intensive aspects outside of the Two-Hour closed laboratory period. Within this structure, each laboratory includes three parts: Pre-lab, In-lab, and Post-lab.

a. Pre-Lab

The Pre-lab exercise is a homework assignment that links the lecture with the laboratory period - typically takes 2 hours to complete. The goal is to synthesize the information they learn in lecture with material from their textbook to produce a working piece of software. Pre-lab Students attending a two-hour closed laboratory are expected to make a good-faith effort to complete the Pre-lab exercise before coming to the lab. Their work need not be perfect, but their effort must be real (roughly 80 percent correct).

b. In-Lab

The In-lab section takes place during the actual laboratory period. The First hour of the laboratory period can be used to resolve any problems the students might have experienced in completing the Pre-lab exercises. The intent is to give constructive feedback so that students leave the lab with working Pre-lab software - a significant accomplishment on their part. During the second hour, students complete the In-lab exercise to reinforce the concepts learned in the Pre-lab. Students leave the lab having received feedback on their Pre-lab and In-lab work.

c. Post-Lab

The last phase of each laboratory is a homework assignment that is done following the laboratory period. In the Post-lab, students analyse the efficiency or utility of a given system call. Each Post-lab exercise should take roughly 120 minutes to complete.

2019-20 ODD SEMESTER LAB CONTINUOUS EVALUATION

Sl No	Date	Experiment Name	Pre-Lab (5M)	In-Lab				Post Lab (5M)	Viva Voce (5M)	Total (50M)	Faculty Signature
				LOGIC (10M)	EXECUTION (10M)	RESULT (10M)	ANALYSIS (5M)				
1											
2											
3											
4											
5											
6											
7											
8											

10											
11											
12											
13											
14											

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SUBJECT CODE: 17CS2212
MACHINE LEARNING

LAB EXPERIMENT #1:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://www.geeksforgeeks.org/data-preprocessing-machine-learning-python/*
2. *https://towardsdatascience.com/introduction-to-data-preprocessing-in-machine-learning-a9fa83a5dc9d*

Pre-Lab Task:

1. Why is the pandas library used and give some examples of classes in the pandas library?

2. Why is the numpy library used what are the classes in that library?

3. Why matplotlib is used and what are the different classes in it?

4. Why the sklearn library used and what is are the different classes in it?

5. Why do we use imputer and OneHotEncoder?

In Lab Task:

NOTE: In machine learning, we create a model and we use that model in the real world for prediction. For creating that model initially we have to process the data. Our machine learning can understand only numerical data, not the categorical data so we have to convert categorical data to numerical data while training the model.

1. There is an MNC company which produces a product 'I'. Now we have a record of information about purchases of previous years based on *COUNTRY*, *AGE* and *SALARY*. Now we have to perform data preprocessing which deals with

    a. Importing the libraries
    b. Importing the dataset
    c. Dealing with missing data
    d. Dealing with categorical data
    e.
    f. Splitting the dataset into training and testing data.

    Download the dataset from here.

    https://drive.google.com/file/d/1M5mE-SPUYrCFEq3XOHipMBWHIW01-uqf/view?usp=sharing

    Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

`

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is a dataset?

2. What are the ways to access a dataset?

3. How can we import the dataset?

4. What is the purpose of preprocessing the dataset?

5. Why do we use LabelEncoder?

Post Lab Task

1. What is Feature scaling and what are its uses?

2. For the same dataset perform the feature scaling.

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #2:

Date of the Session:____/___/___
Time of the Session:_____to_____

References:

1. *https://www.geeksforgeeks.org/regression-classification-supervised-machine-learning*
2. *https://www.geeksforgeeks.org/linear-regression-python-implementation*
3. *https://towardsdatascience.com/introduction-to-machine-learning-algorithms-linear-regression-14c4e325882a*

Pre-Lab Task:

1. What are the types of Machine Learning? Explain briefly about each type.

2. What is linear regression? What are the different types of linear regression?

3. What is Loss Function? Why do we use it?

4. What is gradient descent?

In-Lab Task:

1. There is a company named ML which is recruiting employees. The company has a record of salaries of the previous employees and their years of experience. Now the newcomers are expecting high pay but the company wants to pay the fair amount. So build a linear regression machine learning model to help the company to pay the fair pay based on their experience. Write a python code using sklearn and predict the salary when the employee who has experience of 8 years.

   Download the dataset from here.

   https://mail.google.com/mail/u/0/#inbox/FMfcgxwDqTlKmRqDwJStqCHxLXWxtHpl?projector=1&messagePartId=0.2

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import the energy efficient regression data from azure database and select columns in data set, clean the missing data, split the data, train the model using simple linear regression(select all the dependent columns) and finally evaluate the model.

    1. Find accuracy
    2. Predict the given model with following values.

        Heating load: 24.57, predict the cooling load.

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is regression?

2. How to find the best regression line?

3. What evaluation metric can be used to evaluate a model while a continuous output variable?

4. A statistical model is said to be over fitted when it is trained with a lot of data(true or false).

Post-lab Task:

1. A person wants to build a new website which can predict the profit of the company based on given features: R&D spends, Marketing spends, Administration spends and in which state it is located. He possesses some dataset so by using this dataset build a multiple linear regression model.

   Download the dataset from here.

   https://mail.google.com/mail/u/0/#inbox/FMfcgxwDqTlKmRqDwJStgCHxLXWxtHpl?projector=1&messagePartId=0.1

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #3:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://www.xoriant.com/blog/product-engineering/decision-trees-machine-learning-algorithm.html*
2. *https://saedsayad.com/decision_tree_reg.htm*

Pre-lab Task:

1. What is a Decision tree?

2. What is the difference between Decision tree classification and Decision tree regression?

3. In Decision tree classification, how do you identify the root node?

4. What is ID3 algorithm and how do we use it in Decision Tree regression?

In-lab Task:

1. The sports committee of state wants to provide sports programs to children of state but they are not sure about their participation. So they conduct a survey on children as how many hours they play based on weather conditions. So we need to build a machine learning model which can predict the amount of time children plays based on given weather condition. In supervised learning, this is a regression problem. So, build a decision tree using decision tree regression model on the given dataset. Write a python code for building this model using sklearn and predict the hours played when

   [rainy, hot, low, FALSE]

   Download the dataset from here.

   https://www.xoriant.com/blog/product-engineering/decision-trees-machine-learning-algorithm.html

   https://www.kaggle.com/c/titanic/data

   Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. The sports committee of state wants to provide sports programs to children of state but they are not sure about their participation. So they conduct a survey on children as how many hours they play based on weather conditions. So we need to build a machine learning model which can predict whether children plays based on given weather condition. In supervised learning, this is a classification problem. So, build a decision tree using decision tree classification model by using given dataset. Write a python code for building this model using sklearn and predict whether they play or not for the given value

   [sunny, cool, high, TRUE]

   Download the dataset from here

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. Why do we use entropy in a decision tree?

2. What is Standard deviation and how do we use it?

3. What types of data can be handled by decision trees?

4. What are the ways of avoiding over fitting in a decision tree?

Post-lab Task:

1. What are the issues in Decision tree learning?

2. Import adult census dataset from azure dataset and build a decision tree model and evaluate the result in Microsoft Azure machine learning studio.

    1. Find the accuracy
    2. Predict the occupation for the following dataset

        age: 52, work class: Private, education: Masters, nation: Cuba, Income: <50k

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #4:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://www.datascience.com/resources/notebooks/random-forest-intro*
2. *https://towardsdatascience.com/random-forest-in-python-24d0893d51c0*

Pre-lab Task:

1. What is Random Forest learning?

2. What is the difference between Random forest learning and decision tree learning?

3. What is bootstrap data and out of bag error?

4. What is the difference between Random Forest Classification and Random forest regression?

In-lab Task:

1. There are many students who have attended for GRE and TOEFL exam and their scores are in the dataset. Along with their scores, the Universities will also be considering their CVs for qualification, based on which the students will get the qualification status.

Now help your friend to predict his qualification status based on the above dataset using random forest classification. His marks are as follows:

GRE: 335, TOEFL: 112, CV: weak

Download the dataset from here.

https://www.kaggle.com/duyguay12/regression-examples-for-machine-learning

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. There is a small country called Guinea, where petrol consumption is playing a crucial role in their country's economy. So, the government wants to predict and restrict the consumption of petrol. They possess the data of the last 50 years on petrol consumption which depends upon petrol tax, average income, paved highways, and population driver license. Now build a random forest regression model to help the government of Guinea.

Now predict petrol consumption for the following data:

https://drive.google.com/file/d/1mVmGNx6cbfvRHC_DvF12ZL3wGLSHD9f_/view

Download the dataset from here.

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is ensemble learning explain with example?

2. How is a Decision tree different from a Random Forest?

3. Explain the advantages of Random Forest?

4. Explain the drawbacks in Random Forest Usage?

5. Describe some of the precautions to optimize the performance of the Random Forest?

Post-lab Task:

1. Import adult census dataset from azure dataset and build a random forest model and evaluate the result in Microsoft Azure machine learning studio.

    1. Find accuracy

    2. Predict the occupation for the following dataset

        Recency: 3, frequency: 33, monetary: 7900, time: 77

    https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #5:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://towardsdatascience.com/machine-learning-basics-with-the-k-nearest-neighbors-algorithm-6a6e71d01761*
2. *https://www.saedsayad.com/k_nearest_neighbors.htm*

Pre-lab Task:

1. What are the different types of distance metrics in K-nearest Neighbors algorithm?

2. What does the value of 'K' denote and how do we decide its value?

In-lab Task:

1. Suppose you are in a shopping mall, you have to buy a t-shirt for your friend's birthday. But the problem here is you don't know anything except his height and weight. Based on that predict the size of the t-shirt given the height and weight of the person. Use KNN algorithm for the following.

   Now predict for the following data

   [158, 28]

   https://datahack.analyticsvidhya.com/contest/practice-problem-big-mart-sales-iii/

   https://www.edureka.co/blog/k-nearest-neighbors-algorithm/

   Download the dataset from here.

   Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. There is a selection going on for Guards at parade grounds. Unfortunately, the weighing machine is not working. We can get their 'Age' from their CV and measuring tape to measure the height. From the previous year's dataset, take age, height as criteria and build a machine learning KNN regression model which can predict the weight. Now take K value from 1 to 8 and find the root. Mean square error for each value of K and find the value of K with the least root mean square error.

https://datahack.analyticsvidhya.com/contest/practice-problem-big-mart-sales-iii/

https://www.edureka.co/blog/k-nearest-neighbors-algorithm/

Download the dataset from here.

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What are some applications of KNN?

2. What are the types of distance metrics used in KNN?

3. What is the hamming distance?

4. Why the KNN is called lazy algorithm?

5. Is it case sensitive to outliers?

Post-lab Task:

1. There is a dataset without any columns. But, you need to use it for the mathematical calculations. Without columns names, it is not possible. Assign column names as “X” and “Y” to the dataset using “Python script” in Azure ML Studio.

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Download the dataset from here.

Writing space for the Problem: (For Student’s use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #6:

References:

1. *https://towardsdatascience.com/naive-bayes-in-machine-learning-f49cc8f831b4*
2. *https://en.wikipedia.org/wiki/Naive_Bayes_classifier*

Pre-lab:

1. Define Bayes Theorem.

2. What are the MAP hypothesis and maximum likelihood?

3. What is Bayes optimal classifier?

4. Why do we use Gibb's algorithm?

In-lab Task:

1. There is a company named QWE which releases a new product and they want to know who will buy the product based on the given features gender, age, estimated price. Build a naive Bayes classifier model to help the company to know who will buy the product. Divide the data set into training and testing data and also print the confusion matrix.

Download the dataset from here.

https://medium.com/@akshayc123/naive-bayes-classifier-nb-7429a1bdb2c0

.**NOTE: DON'T CONSIDER USER ID AS AN INPUT**

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import blood donation dataset from azure dataset and build a naive BAYES classifier. Model and evaluate the result in Microsoft Azure machine learning studio.

a. Find the accuracy

b. Predict the occupation for the following dataset

Recency: 3, frequency: 33, monetary: 7900, time: 78

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is Posterior Probability [P(H/X)]?

2. What is Prior probability [p(H)]?

3. Explain the formula for Bayes Theorem?

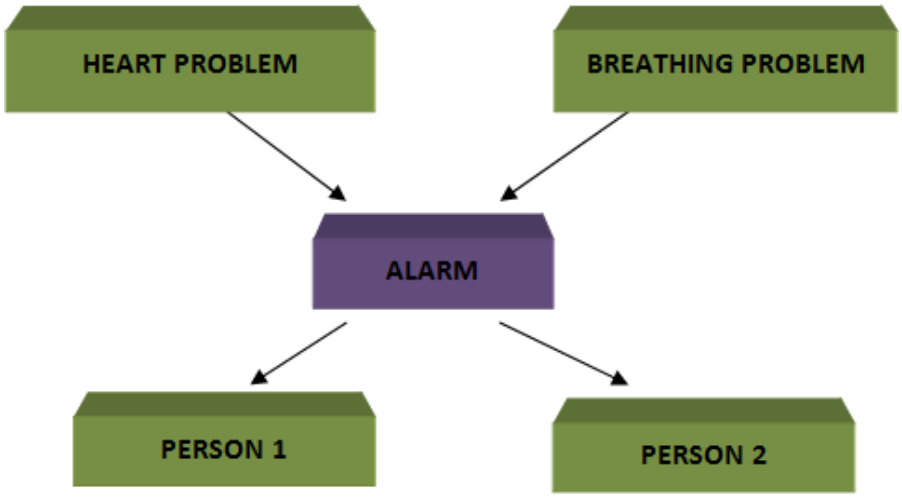
4. What are the components in Bayesian Belief Network?

5. Explain Conditional probability?

Post-lab Task:

1. There are three neighbors. One of them has a grandfather who is suffering from heart and breathing problems. The person should go to work but he couldn't leave his grandfather alone. So he will be setting an emergency alarm for his grandfather to ring in case of any danger. He intimates his neighbors to call him at any cost if they hear the alarm.

There are some chances that the neighbors couldn't respond properly. The first person may not be able to hear the alarm if they are very far away from the house. The second person is a music lover so he/she will be listening with high volume so he/she may not be able to hear the alarm. So, these are the two cases where the two persons may not respond.



Given:

P (H=T) = 0.001 P (B=T) =0.002

P (H=F) = 0.999 P (B=F) =0.998

H	B	P(A=T)	P(A=F)
T	T	0.95	0.05
T	F	0.95	0.06
F	T	0.28	0.72
F	F	0.005	0.995

A	P(P1=T)	P(P1=F)
T	0.94	0.06
F	0.53	0.47

A	P(P2=T)	P(P2=F)
T	0.10	0.90
F	0.10	0.90

P (p1, p2, A, H, B)

P (p1, p2, A, ~H, ~B)

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #7:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://medium.com/@sparshtemani31415/k-means-clustering-algorithm-258bd752042*
2. *https://www.datascience.com/blog/k-means-clustering*

Pre-lab:

1. What is clustering?

2. What are the different types of clustering?

3. What is soft clustering and hard clustering?

4. What the centroid represents?

5. What are the pros and cons of K-means clustering?

In-lab Task:

1. We have both annual income and spending score of different people stored in a dataset. Now we have to tell which person belongs to which category. Use the K-means clustering algorithm for the following dataset. Take k=5 and print centroid value for each cluster.

   Download the dataset from here.

   https://www.kaggle.com/shwetabh123/mall-customers

   https://medium.com/machine-learning-algorithms-from-scratch/k-means-clustering-from-scratch-in-python-1675d38eee42

   Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import the flight delay dataset from azure database, apply k means clustering model. With k value =2 and k-means++ algorithm and visualize the output in Microsoft azure machine learning studio.

   Download the dataset from here.

   https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. Can you find clustering in student sitting in the lab?

2. Clustering is learned with the example having (data and label or only data)?

3. In K-means clustering, objects are clustered based on which type of distance?

4. Can we choose a particular k which is best for clustering?

5. What are the steps needed in performing k-means clustering?

6. What is meant by least mean square error

Post-lab Task:

1. Write an algorithm for K-means++?

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #8:

Date of the Session:____/___/___
Time of the Session:_____to_____

References:

1. *https://www.thelearningmachine.ai/hierarchical*
2. *https://www.datanovia.com/en/lessons/agglomerative-hierarchical-clustering/*

Pre-lab Task:

1. What is hierarchical clustering?

2. What are the different types of hierarchical clustering?

3. What are the uses of the dendrogram graph in hierarchical clustering?

4. List some applications of hierarchical clustering.

In-lab Task:

1. A survey conducted by the Times of India shows the GDP of the country and the literacy rate of the country. Now using agglomerative algorithm cluster the countries which are having a similar GDP and literacy rate.

   Download the dataset from here.

   https://medium.com/datadriveninvestor/unsupervised-learning-with-python-k-means-and-hierarchical-clustering-f36ceeec919c

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import the flight delay dataset from azure database, apply k means clustering model. With k value =2 and First N algorithm and visualize the output in Microsoft azure machine learning studio.

   Download the dataset from here.

   https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What are the different types of hierarchical clustering algorithms.

2. Explain the agglomerative clustering algorithm.

3. What is the difference between agglomerative and divisive clustering algorithms.

4. What is the need of distance measure in the hierarchical clustering algorithm.

5. List out the pros and cons of hierarchical clustering algorithms.

Post-lab Task:

1. Discuss in brief about decisive clustering.

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #9:

Date of the Session:____/___/____

Time of the Session:_____to_____

References:

1. *https://medium.com/machine-learning-101/chapter-2-svm-support-vector-machine-theory-f0812effc72*

Pre-lab Task:

1. What is SVM?

2. What is the basic principle of hyper plane?

3. How do we select the most optimum hyper plane?

4. In case of non linear data what does SVM do?

In-lab Task:

1. A company is in confusion to give the promotion to their employees and so construct SVM model to help the management by using previous year's data which includes visualizing the testing and training set results and also predict the promotion status for an employee who has age experience of 30 years and salary of 45000.

   Download the dataset from here.

   https://www.datacamp.com/community/tutorials/svm-classification-scikit-learn-python

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import flight delays data from the Azure database and construct the support vector machine learning model and evaluate the result using Microsoft Azure machine learning studio.

    a. Find the accuracy

    b. Predict cancelled flights based on the given factors

    Month: 10, day of month: 14, day of week: 4, origin airport id: 12451, destination airport id: 10397.

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is generalization error in terms of the SVM?

2. What is hard margin?

3. The effectiveness of an SVM depends upon**?**

4. What are the real world applications of SVM?

`

Post-lab Task:

1. Discuss in brief about kernel SVM and apply different kernels and predict the accuracy of the given data?

https://drive.google.com/open?id=1qO5YGpcazw8rabD7DUwm2x7yEykQOIqwydp1kC1AOOM

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #10:

Date of the Session:____/___/____
Time of the Session:_____to_____

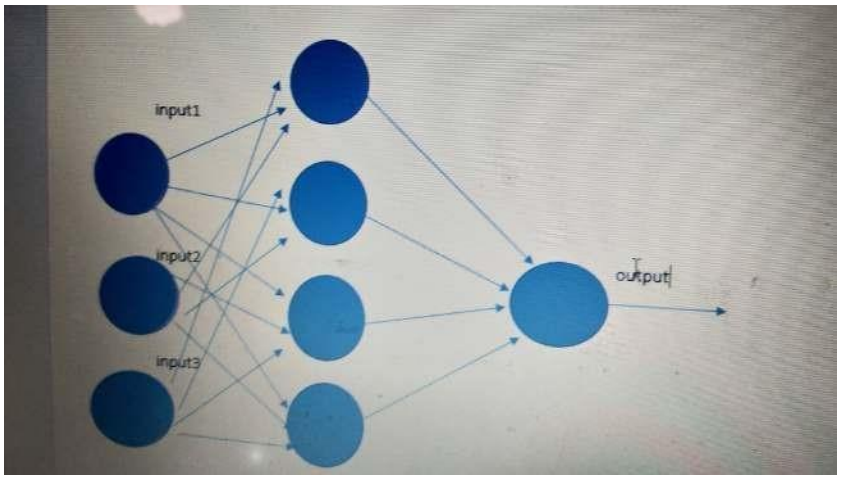
References:

1. https://towardsdatascience.com/nns-aynk-c34efe37f15a

In-lab Task:

1. Build an artificial neural network from scratch by taking 3 input neurons and 1 output neurons. Use 4 hidden neurons in between and use activation function as sigmoid function. Use any loss function like mean squared error function also use gradient descent algorithm to find weights for synapses. Finally generate the output for the given data [1,1,0]

INPUT1	INPUT2	INPUT3	OUTPUT
0	0	1	0
0	1	1	1
1	0	1	1
1	1	1	0



Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is CNN? Explain it with an application.

2. What are the two types of modules in ANN?

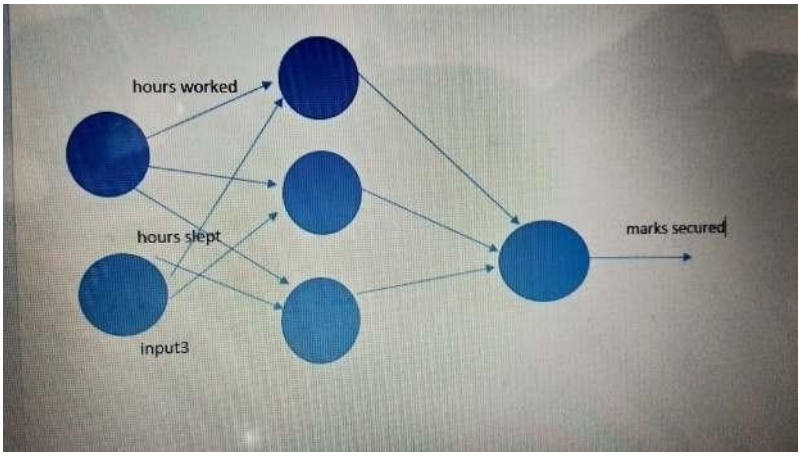
3. Define Sequential neural network.

4. Define dense neural network.

5. Which library should be imported while working with ANN?

Post-lab Task:

1. Build a neural network for regression by taking no of hours studied, no of hours slept and we need to predict the score out of 100 that he scored in exam. So build a neural network regression model which as 2 input neurons, 3 hidden layers and 1 output layer. Use activation function as sigmoid function, use any loss function and use gradient descent for finding accurate values of synapses. Now predict the values for [6,5].



Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

2. Import Bill gates RGB image data from the Azure database and construct the support Neural network model and evaluate the result using Microsoft Azure machine learning studio.

    a. Find the accuracy

    b. Predict the green cells with the following data

        X: 0, y: 94, R: 18, B: 91

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #11:

Date of the Session:____/___/____
Time of the Session :_____to_____

References:

1. *https://towardsdatascience.com/nns-aynk-c34efe37f15a*

Pre-lab Task:

1. What is Deep learning?

2. What is difference between machine learning and deep learning?

3. Can neural network handle large amount of data?

4. What is activation function?

5. What is back propagation in neural networks?

In-Lab Task:

1. There is an MNC company and they want to know the no of employees will be working by the end of the year. The exit status of an employee will depend on their credit Score, Geography, Gender, Age, tenure, balance, no of products, hascrcard, is an active member, estimated salary. They also possess the previous year's data so help the company by building a neural network model.

   Download the dataset from here.

   https://medium.com/@williamkoehrsen/deep-neural-network-classifier-32c12ff46b6c

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. List some commercial practical applications of Artificial Neural Networks.

2. What are the applications of deep learning?

3. Perceptron receives input signals and if the sum of the input signals exceeds and certain threshold value, it either outputs a signal or does not return any output?

4. How human Brain works?

Post-lab Task:

1. Import the adult census data from Azure dataset and build a model which consists of decision tree model, random forest model, logistic regression model, SVM model and find which machine learning algorithm gives the better prediction for that dataset .Use cross validation.

https://docs.microsoft.com/en-us/azure/machine-learning/studio/use-sample-datasets

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #12:

Date of the Session:____/___/___
Time of the Session:_____to_____

References:

1. *https://www.tensorflow.org/tutorials*

Pre-lab Task:

1. What is difference between machine learning and deep learning?

2. What are types of errors used in Tensor flow? Write syntax any of the two errors?

3. What is gradient descent and what it is used for?

4. What is the major difference between constant, variable and placeholder in Tensor flow?

In-lab Task:

1. There is a scientist named Jack Sparrow. Jack Sparrow builds a robot. He wants to teach his robot to recognize numbers. So he wants to build a model using Tensor flow, but he doesn't know Tensorflow and he has no time to learn Tensorflow. So he asks his all friends to build a model using Tensorflow so he can pick the model with high accuracy and you are one of his friends so help your friend by building a model ?(hint: use "MNIST_data" dataset from Tensorflow.

https://data-flair.training/blogs/tensorflow-mnist-dataset/

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1) What are the applications of deep learning?

2) What is the difference between simple neural network and convolutional neural networks?

3) What are deep learning frameworks or tools?

4) What are applications of deep learning in Natural language processing?

5) What are the disadvantages of deep learning?

Post-lab Task:

1) Display how many images are used for training?

2) Display how many images are used for testing?

3) Display the 1000th image present in the training data?

4) How to run a variable write a simple code using Tensorflow?

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #13:

Date of the Session:____/___/___
Time of the Session:_____to_____

References:

1. *https://www.geeksforgeeks.org/python-gui-tkinter/*

Pre-lab Task:

1. Create a simple window using Tkinter.

2. A person clicked on a tkinter button with button text “K L University”. A new window popped up with display text “Welcome to K L University”. Now, write a python code for implementing this.

3. What is Canvas?

4. Create a simple canvas window with Green background color.

5. Which tkinter widget is used to take input from the user?

In-lab Task:

1. Mahesh owns a real estate business. He is so worried about his business because the interest rates and stock index prices are fluctuating. But, he doesn't know any programming. For solving this issue, he wants to have a GUI application which is user-friendly and can predict the stock index price based on the interest rate. Help Mahesh by developing a user-friendly GUI application (Based on Linear regression) for him.

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is GUI, how is it used in our University?

2. What are the different ways of developing GUIs in Python3?

3. What is Tkinter?

4. What are widgets? Explain any two of them in brief.

Post-lab Task:

1. Mahesh later realized that not only the interest rate but also other factors like Year, Month and unemployment rate can affect the stock index price. On considering all these factors, develop a new GUI application (Based on Multiple Linear regression) for him which can predict the stock index prices for him.

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation:

LAB EXPERIMENT #14:

Date of the Session:____/___/____
Time of the Session:_____to_____

References:

1. *https://www.analyticsvidhya.com/blog/2017/07/introduction-to-genetic-algorithm/*

Pre-lab Task:

1. What is meant by population and fitness function?

2. What is genotype and phenotype?

3. What are the genetic operators?

In-lab Task:

1. You're taking a backpack with you; however, the maximum weight it can carry is 20 kilograms. You have a number of survival items available, each with its own number of survival points. You're objective is to maximize the number of survival points. The data is given as follows:

    a. Data is given as follows:

    b. Pocketknife 10.00 1.00

    c. Beans 20.00 5.00

    d. Sleeping bag 30.00 7.00

    e. Rope 10.00 5.00

    f. Compass 30.00 1.00

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

Viva-voce:

1. What is evolutionary computing?

2. What are different genetic operators?

3. What is genetic programming?

4. What is a chromosome?

5. What is elitism in Genetic Algorithms?

Post-lab Task:

1. What are the applications, disadvantages, advantages over gradient descent?

Writing space for the Problem: (For Student's use only)

Writing space for the Problem: (For Student's use only)

(For Evaluator's use only)

Comment of the Evaluator (if Any)	Evaluator's Observation Marks Secured:_____out of _____ Full Name of the Evaluator: Signature of the Evaluator Date of Evaluation: